

**Public Page:**

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Contract Number: DTRS56-04-T-0010

Project Title: Evaluation of Hydrogen Cracking in Weld Metal Deposited using Cellulosic Electrodes

Prepared by: Edison Welding Institute, Inc., Columbus, OH 43221

Quarterly period ending: August 3, 2005 {effective date: October 4, 2004}

Objectives: The objectives of the proposed project can be summarized as follows: (1) To determine the effect of electrode drying and arc length on weld metal chemistry, mechanical properties and hydrogen cracking susceptibility. (2) To determine the effect of electrode re-hydration on weld metal chemistry, mechanical properties and hydrogen cracking susceptibility. (3) To develop practical guidelines on how to prevent hydrogen cracking in welds deposited using cellulosic covered electrodes.

- Technical Status

- Continued technical work Tasks 1, 2, 3, and 7. Note that Tasks 2 and 5 are funded by a separate project (EWI Project #46354CAP) and are tracked under this effort as a cost-share.
- Task 1: Selection/Procurement of Welding Electrodes
  - Obtained EXX10 electrodes from Lincoln, Hobart and ESAB for evaluation.
- Task 2 & 3: Preliminary Welding and Testing of Dried and Re-hydrated Electrodes
  - Electrodes were tested in the as-received condition for coating moisture and weld metal chemical analysis. The electrodes were then dried for 7 days at 86 °C. Following the drying operation, they were again tested for coating moisture and weld metal chemical analysis.
  - Based on the results of the analyses, two electrodes from each class [E6010 (ESAB Sureweld 10P & Hobart Pipemaster Pro-60), E7010 (Lincoln Shield Arc HYP+ & Hobart Pipemaster 70), E8010 (Hobart Pipemaster 80 & Lincoln Shield Arc 70+), E9010 (Lincoln Shield Arc 90)] were selected for further testing. The selection was based on which electrodes showed the greatest change in chemical analysis following drying. The Hobart Pipemaster 90 was never received, so only one 9010-class electrode has been included in the program.
  - Welding and mechanical testing of test plates produced using the re-hydrated electrodes has also been completed.
- Task 7: Reporting
  - Results of earlier work presented at 2005 AWS Welding Show
  - Results of current work presented to PRCI Pipeline Materials Committee Meeting, 15-May-2005.